HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)

Uthamapalayam, Theni District. Pin Code: 625 533.

DEPARTMENT OF PHYSICS

PART – IV PG – NME PHYSICS

SYLLABUS

Choice Based Credit System – CBCS

(As per TANSCHE/MKU Guidelines)

(Academic Year 2020-2021 onwards)

Details of Course Category, Code, Credits & Title

Course Category	Course Code	Course Title	Hrs	CIAE	TEE	Max. Marks	Credits
Semester – III							
Part – IV							
NME	20PPHN31	Medical Physics and Opto Electronics	3	25	75	100	3

Course Code	Course Title	Category	Total Hours	Credits
20PPHN31	**Medical Physics and Opto Electronics**	**NME**	**45**	**3**

Nature of Course	
Knowledge Oriented	
Skill Oriented	✓
Employability Oriented	
Entrepreneurship Oriented	

Course Relevance	
Local	
Regional	
National	
Global	✓

Preamble

To gain more knowledge about Medical physics in order to develop knowledge about Transducers, EMG scanners, optical fibres, LASERS and various biomedical instruments.

Syllabus

UNIT I 9 Hours

Transducers - Characteristics of transducers - Static and dynamic active transducers - Magnetic induction type - Piezo electric type - Photo voltaic type – Thermo electric type - Passive transducers - Resistive type - Effect and sensitivity of a bridge - Capacitive transducer - Linear variable differential transformer (LVDT).

UNIT II 9 Hours

Characteristics of basic recording system - Electro Cardio Graphy (ECG) - ECG leads - Unipolar and bipolar - ECG recording setup - Electroencephalogram graph (EEG) – Origin - Block diagram of EEG unit.

UNIT III 9 Hours

Electromyograph (EMG) - Block diagram of EMG recorders - Digital thermometer - Computer tomography (CT) principle - Block diagram of CT scanner.

UNIT IV 9 Hours

Principal of optical fibre – Light transmission in optical fibre – Acceptance angle and Numerical aperture - Fibre index profiles - step index – graded index fibre – Advantage of fibre in optic communication – optical switching – logic gates.

UNIT V 9 Hours

Laser - Emission and absorption of light - Spontaneous and stimulated emission - Laser principle – Einstein's coefficients - Construction, working and characteristics of Ruby laser - He – Ne laser, Semiconductor laser – Applications.

Text Books

Dr. M. Arumugam***, Biomedical Instrumentation***, (1994).

P.K. Palanisamy, ***Semiconductor physics and opto electronics***.

Reference Books

G. Aruldhas and P. Rajagopal, ***Modern Physics***.

R.S. Khanpur, ***Hand book of biomedical instrumentation***, Tata-McGraw Hill, 1999.

Pedagogy

Chalk & Talk, E-Resources, Group Discussion

Teaching aids

Black Board, LCD Projector

Course Contents and Lecture Schedule

Module No.	Topic	No. of Lectures	Content Delivery Methods
	UNIT – I		
1.1	Transducers, Characteristics of transducers, Static and dynamic active transducers	3	Chalk & Talk
1.2	Magnetic induction type, Piezo electric type, Photo voltaic type, Thermo electric type, Passive transducers	3	E-Resources
1.3	Resistive type, Effect and sensitivity of a bridge, Capacitive transducer, Linear variable differential transformer (LVDT)	3	Discussion
	UNIT – II		
2.1	Characteristics of basic recording system,Electro Cardio Graphy (ECG)	3	Discussion
2.2	ECG leads, Unipolar and bipolar, ECG recordingsetup	3	Chalk & Talk
2.3	Electroencephalogram graph (EEG), Origin Blockdiagram of EEG unit	3	E-Resources
	UNIT – III		
3.1	Electromyography (EMG)	3	E-Resources
3.2	Block diagram of EMG recorders, Digitalthermometer	3	Chalk & Talk

3.3	Computer tomography (CT) principle, Blockdiagram of CT scanner	3	Discussion
UNIT – IV			
4.1	Principal of optical fibre, Light transmission inoptical fibre	3	Discussion
4.2	Acceptance angle and Numerical aperture, Fibre index profiles, step index, graded index Fibre	3	E-Resources
4.3	Advantage of fibre in optic communication, optical switching, logic gates.	3	Chalk & Talk
UNIT – V			
5.1	Laser, Emission and absorption of light, Spontaneous and stimulated emission	3	E-Resources
5.2	Laser principle, Einstein's coefficients, Construction, working and characteristics ofRuby laser	3	Chalk & Talk
5.3	He – Ne laser, Semiconductor laser, Applications.	3	Discussion
	Total	**45**	

Course Designer
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